CAN I MONITOR MY RANGE EFFECTIVELY AND QUICKLY?

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Introduction

Managing livestock grazing on rangeland is much like driving a car. It takes more than simply starting the engine and roaring down the highway. A driver must periodically adjust his car's speed and direction based on what he sees, feels, and hears. The instruments on the dashboard help guide him by indicating how the car is operating. In a similar fashion, grazing management is much more than simply turning out a specific number of livestock in the spring and gathering them in the fall. Livestock grazing must be periodically adjusted based on what a rancher observes. Rangeland monitoring data is the compass on the dashboard that helps indicate whether adjustments are needed in the timing, frequency, severity, or selectivity of grazing.

Q. Why do I need to monitor my range? I already monitor my cattle weights, isn't that enough?

Tracking animal performance is definitely worthwhile. But these records do not tell much about rangeland health. The principal reason is that a time lag exists between when the range deteriorates and when the degradation is reflected in animal performance. The range deteriorates first and may degrade appreciably before the animals show any effect. This is because the animals can initially compensate by feeding on less preferred forage plants and by using energy and nutrients stored in their bodies. By the time animal performance declines, the range may have been degraded to the point where it will require decades to recover.

Q. Should I monitor my riparian areas or my uplands?

Both. Concern about riparian conditions and water quality will certainly continue into the foreseeable future. Although riparian areas comprise only small proportions of the land area in most pastures or allotments, these water-enriched zones deserve special attention because they provide such a wealth of products and values. But monitoring only riparian areas and ignoring the uplands is unwise. Upland conditions are vitally important to the health of the landscape, and upland conditions are interdependent with conditions in adjacent riparian areas. The health of the riparian areas often largely depends upon the health of the uplands.

Within either riparian areas or upland sites, the monitoring location needs to be selected based on the information desired. For example, if a rancher wants to evaluate a large area, a monitoring site is needed that is representative of the larger area. These monitoring sites are called **key areas**. Sometimes, however, a rancher may be interested in monitoring a

unique spot because of its exceptional resource value or unusual susceptibility to damage. Such sites are called **critical areas**. It is important to know whether a monitoring site is a key area vs. a critical area when interpreting the monitoring information. Changes to key areas indicate that similar changes likely have occurred on the larger area represented by the key area. In contrast, changes to a critical area cannot be extrapolated to other sites.

Q. What are 3 simple, fast, and inexpensive techniques that I can use to monitor my range?

The 3 techniques that I recommend are: 1) completing checklists of range health, 2) mapping utilization, and 3) taking photographs at permanent locations. Range health checklists help focus the observer's eye as he visually observes the current status of the range; utilization maps help a rancher assess where and how livestock grazed in a given grazing season; and repeat photography objectively documents long-term changes to the landscape.

Range Health Checklists

Most ranchers have a keen eye for judging the condition of their livestock. Range health checklists help ranchers complete similar appraisals of their rangeland. A list of useful indicators for assessing range health is given in Table 1. Range health is probably satisfactory if most of the questions can be answered "yes." If most of the answers are "no", then range health is probably at risk or unsatisfactory. Completing these checklists for a site once every few years can provide insight into long-term changes in range health.

One drawback to using checklists is that the questions need to be answered relative to each site's ecological potential. Inexperienced observers often overestimate the potential productivity of rangelands and, consequently, underestimate range health.

Table 1. A checklist of useful indicators for judging rangeland health.

	YES	NO
1. Are desirable forage species abundant?	____	____
2. Are noxious weeds rare or absent?	____	____
3. Is there a variety of species of perennial plants?	____	____
4. Are the plants well distributed across the site?	____	____
5. Is mulch present and well distributed across the site?	____	____
6. Are all age classes of plants (seedling, young, mature) present?	____	____
7. Are preferred forage species accessible to grazing/browsing animals?	____	____

8. Do preferred forage species have adequate residual remaining after grazing?	____	____
9. Are lowly palatable plants grazed lightly or not at all?	____	____
10. Is gully erosion minimal or absent?	____	____
11. Is soil movement minimal?	____	____
12. Is at least 50% of the ground covered by a combination of plants, mulch, rock or gravel?	____	____
13. Are pedestalled plants rare or absent?	____	____
14. Do lichen lines on rocks extend to the soil surface?	____	____
15. Is the mulch becoming incorporated into the soil?	____	____

Utilization Mapping

Utilization is the proportion of current year's total aboveground plant production that is consumed or trampled by grazing animals. It can describe use of an individual plant species or use of a site's vegetation as a whole. Although a complete discussion of the uses and abuses of utilization monitoring is beyond the scope of this article, one important point to remember is that a targeted level of utilization (regardless of whether it is expressed as a percentage or as a stubble height) should not be considered a management objective. This is because monitoring utilization is much like scoring body condition of cattle. A given body condition score is not a rancher's objective, but rather an index to help the rancher achieve a livestock objective such as winter survival of cows, calving ease, calf birth weights, short breed-back intervals, etc. Likewise, utilization is an index of grazing impact to rangeland to help a rancher or any other rangeland manager achieve some objective for range health or range production. These objectives may or may not be reached even when a "proper use level" is attained.

Livestock distribution and utilization normally vary within a pasture. Some areas are used more than others. Mapping the pattern of pasture utilization at the end of the grazing season is a great way to identify over- and under-used portions of a pasture. This information can then be used to improve grazing management next year and to evaluate potential locations for range improvement practices such as water developments, prescribed burns, herbicide applications, or mechanical treatments. Maps should include the entire pasture, delineated into 5 categories of utilization: none, light, moderate, heavy, or severe (Table 2). The categories can describe the average utilization of a single, preferred forage species or the average utilization of all the plants in the pasture. Whichever approach is used should be clearly noted somewhere on the map. The photo guides in Figures 1 and 2 can be used to accurately estimate percent utilization of individual plants and thereby help observers to identify the appropriate utilization category for mapping.

Table 2. Description of categories for mapping utilization.

Use Class	Average Utilization of Individual Plants	Description
None	0%	No plants grazed.
Light	1-30%	Less than half of the plants received 70% use, most plants ungrazed (0% use). Only the best forage plants were grazed.
Moderate	31-60%	Most plants received 70% use, a few plants at 10-30% use, and a few plants ungrazed (0% use).
Heavy	61-80%	Almost all plants received 70% use or more, and very few, if any, were ungrazed (0% use).
Severe	>81%	All plants grazed. Almost all plants received 90% use.

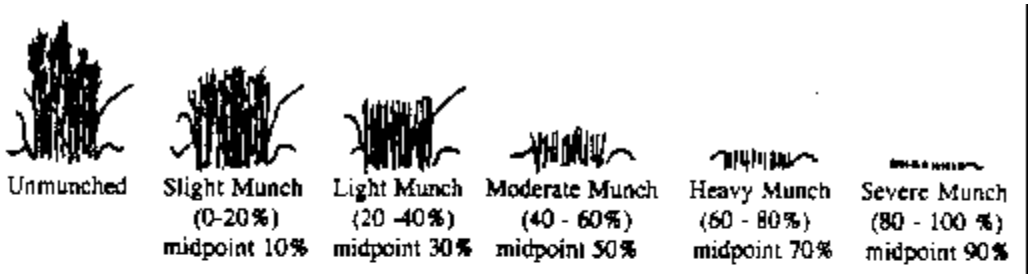
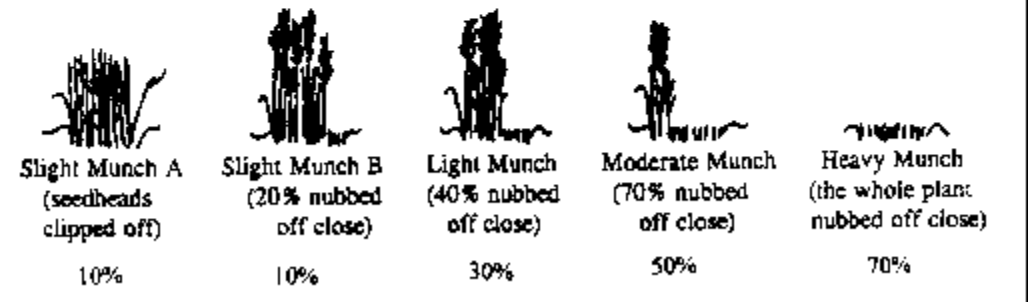


Figure 2. Photo guide for "uneven" utilization.



Figures taken from McKinney. 1997. Rangelands. 19:4-7.

Repeat Photography

Repeat photography is a quick and objective way to assess long-term changes in rangeland health. Photographs are also very useful for communicating with others. Family members, ranch employees, personnel from government agencies, judges and juries, and interested citizens can all readily understand information presented in photographs. One good picture usually conveys a message more effectively than voluminous amounts of numerical data.

Photo monitoring is easy. Use a 35 mm camera and color print film with an exposure index of 100. At each monitoring location, take a close-up photo of the ground and a general, or landscape, view picture. For the close-up photo, a 3-ft x 3-ft frame works well. This frame can be made of most anything. A convenient frame can be made from two, white 6-ft folding carpenter's rulers folded at their 3-ft position and placed to face each other, collectively forming a square. White PVC pipe also makes a lightweight frame that is visible in the pictures and can be disassembled so as to fit into a rifle scabbard attached to a saddle or to fit behind the seat of a pickup.

At least 3 corners of each plot frame location should be permanently marked with stakes. Large nails, spikes, angle iron or re-bar rods can be used, but these kinds of stakes can be harmful to animal hooves and automobile tires. Narrow-diameter, white PVC pipe capped on one end makes an inexpensive, safe stake. Painting steel stakes a bright color such as yellow or orange will help when relocating the stakes in future years. If the plot frame location is difficult to find, place a steel witness post at least 20-50 ft away (to avoid animal attraction). Record the compass bearing and distance of the plot frame location from the witness post. If possible, always place witness posts the same direction and distance from all photo plots.

A plot sign should be included in the plot photo. Use a felt-tip pen and legibly write the photo location and date on pastel-colored paper. White paper is too bright.

Orient the photo plots so that the photographer stands on the north side of the plot. This way his shadow won't cast across the plot and interfere with the picture. I prefer to take the plot photo at an oblique angle from about 3 ft. away. Some people prefer to stand next to the plot frame, hold the camera at arm's length, point the lens at the ground and take a vertical picture from above the photo plot.

The general view picture should include a distinct landmark in the background to insure that the photograph can be repeated in the future. It is helpful to bring along one copy of the previous photographs taken at the site to aid in finding the photo location and to insure that the photograph can be repeated. But original photos and notes should never be taken along into the field. I recommend having 2 complete sets of photos and notes. One is the field copy while the original remains in a fire-proof safe or safety deposit box. If the monitoring locations are on a public land lease or allotment, I suggest placing an additional copy on file with the management agency. Photo monitoring provides a good opportunity for ranchers and agency personnel to visit their range together. Cooperatively taking the photos and interpreting them builds mutual understanding and trust.

Photos should be repeated at the same stage of plant development, independent of the calendar date. It is important to make the commitment to take the pictures every year, but

be careful and don't get too ambitious. It is better to have a few sites where the pictures actually get taken every year, rather than having a larger number of sites whose photos are only retaken once in a great while. The best time to monitor pastures in rotational grazing systems is during the season or year when livestock are not in the pasture.

The most important and most difficult part of using repeat photography is correctly identifying the cause of any change evidenced in the photographs. Knowledge and experience are needed to reach the correct conclusions. Additional information needs to be collected to aid the interpretation. Useful information includes weather data, livestock numbers and turn-in/turn-off dates, wildlife numbers, insect densities, fire records, rodent densities, recreation activities, forestry activities, and vandalism. Another way to aid photo interpretation is to make at least a preliminary interpretation while out in the field taking the pictures. This allows an opportunity to look for additional indicators, take extra pictures, or discuss the results with others. Waiting to interpret the photos until months later may mean it is too late in the year to revisit the site and collect more information.

Ranchers just beginning to use repeat photography should remember that the oldest picture they'll ever have is the one they take today. So start taking pictures! However, one good way to jump-start a photographic record is to search through family photo albums looking for range scenes that can be rephotographed today. Old photographs of family picnics often prove useful.

Conclusions

You can monitor your range effectively and quickly. Range health checklists, utilization maps, and repeat photography are simple, easy, and inexpensive tools that provide invaluable information. The only thing that these tools require is your commitment to use them. So the decision is yours. The next time your grazing management is at a crossroads and you're trying to decide which way to proceed, what will you see when you look down at your dashboard--a compass full of monitoring data giving you clear directions, or only a pair of fuzzy dice upon which to roll your luck and hope for the best?